

Work Order ID 54732

December 17, 2009 1:08:37 PM



Page 1

Item ID: D212-664-101TRN

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Turning Detail

Start Date: 17/12/2009 Start Qty: 1.00



Cust Item ID:

Req'd Date: 31/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

RF

Date: 02/12/17

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D212-664-141

Rev D

100

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA113
2-Turn first side as per Folio FA113
3-File down transition lines smooth.

Q.M. 10 - 01 - 23 @

110

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

Q.M. 10 - 01 - 23 @

120

MORI SEIKI CNC LATHE LARGE

0.00



Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Turn second side as per Folio FA113
2-File down transition lines smooth.
3-Remove sand and plugs

Q.M. 10 - 01 - 23 @

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Work Order ID 54732

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Page 2

Item ID: D212-664-101TRN

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Setup Start



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Stop



Item Name: Crosstube Turning Detail

Start Date: 17/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 31/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

Q.A 10 - 01 - 23

140

QC8- Inspect parts - second check

0.00



QC

Memo

0.00

Quality Control

14 MB 10-01-26

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

15 MB 10-01-26

W/O:		WORK ORDER CHANGES					
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Work Order ID 54732

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Page 3

Item ID: D212-664-101TRN

Accept



Setup Start



Revision ID:

Stop



Item Name: Cresstube Turning Detail

Start Date: 12/12/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 12/12/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

160

QC3- Inspect Part Finish

0.00

DD

10-1-26

QC

Memo

0.00

Quality Control

170

Packaging

0.00

Packaging

Memo

0.00

Packaging

Identify and Stock in kanban rack
Location: *Sub 62*

14

&

MB 10-01-26

180

QC21- Final Inspection - Work Order Release

0.00

QC

Memo

0.00

Quality Control

10/01/26 *JA*

MF 10-1-26

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

December 17, 2009 1:08:40 PM

Page 1

Work Order ID: 54732



Parent Item: D212-664-101TRN



Parent Item Name: Crosstube Turning Detail

Start Date: 17/12/2009

Required Date: 31/12/2009

Comments: IPP RevC: as per ECN09-696 09.11.20 DD verified by:EC

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

D6005-128

Manufactured

No

120

Each

2.0000

1.0000



Crosstube Material



A.M 10-01-23

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

LG

2

34686

1

38337

1

B 53153

①

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	54732
Description: Crosstube Assembly (205/212/412 High Fwd)	Part Number:	D212-664-141
Inspection Dwg: D212-664-141 Rev: 02		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	0.200	/			
	R0.063	+/-0.010	R0.063	/			
	2.740	+0.005/-0.000	2.740	/			
	5.097	+/-0.030	5.097	/			
	2.304	+0.005/-0.000	2.307	/			
	2.340	+0.005/-0.000	2.343	/			
	2.398	+0.005/-0.000	2.403	/			
	2.448	+0.005/-0.000	2.452	/			
	2.498	+0.005/-0.000	2.501	/			
	2.549	+0.005/-0.000	2.554	/			
	2.599	+0.005/-0.000	2.604	/			
	2.671	+0.005/-0.000	2.675	/			
	2.701	+0.005/-0.000	2.706	/			
SIDE B	0.200	+/-0.010	0.200	/			
	R0.063	+/-0.010	R0.063	/			
	2.740	+0.005/-0.000	2.740	/			
	5.097	+/-0.030	5.097	/			
	2.304	+0.005/-0.000	2.307	/			
	2.340	+0.005/-0.000	2.343	/			
	2.398	+0.005/-0.000	2.403	/			
	2.448	+0.005/-0.000	2.452	/			
	2.498	+0.005/-0.000	2.501	/			
	2.549	+0.005/-0.000	2.554	/			
	2.599	+0.005/-0.000	2.604	/			
	2.671	+0.005/-0.000	2.675	/			
	2.701	+0.005/-0.000	2.706	/			
	126.51	+/-0.020	126.510	/			

Measured by:	Q.M.	Audited by:	MB	Prototype Approval:	N/A
Date:	10-01-22	Date:	10-01-26	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-101)	KJ/JLM	
B	06.03.15	Tolerance revised for 5.097 per Dwg Rev update	KJ/JLM	
C	07.05.28	Dwg Rev updated	KJ/JLM	

W/O:		WORK ORDER CHANGES					
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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D

Item	Qty -141	Qty -141B	Part Number	Description
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.514±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS
6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE
SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR
DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND
MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT
HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 541732

Bl 09-12-17

RELEASED
2009-10-29
MR

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>PH</i>	DART AEROSPACE LTD	
DRAWN	<i>RF</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>Q</i>	DRAWING NO.	REV. D
MFG. APPR.	<i>DS</i>	D212-664-141	SHEET 1 OF 4
APPROVED	<i>AP</i>	TITLE	SCALE
DE APPR.	<i>H</i>	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2009 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

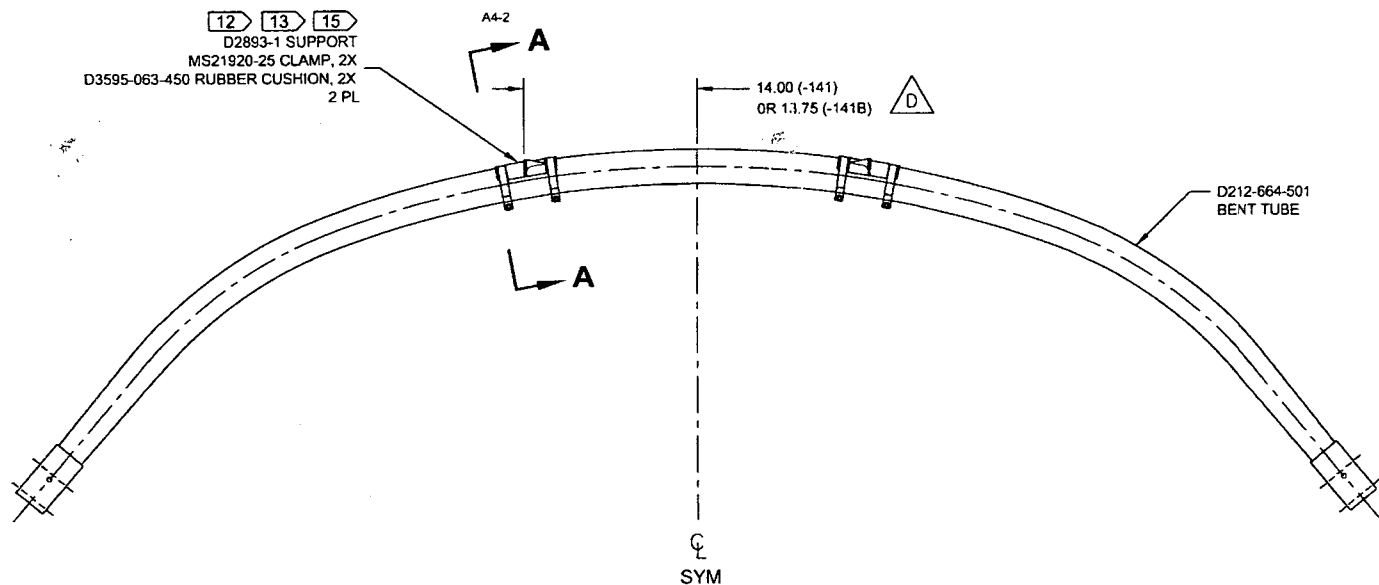
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

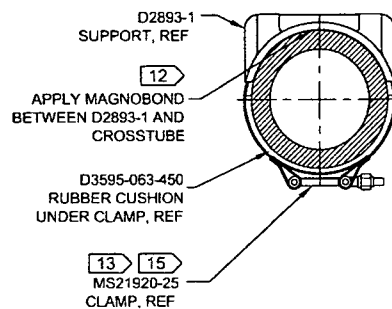
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries



**D212-664-141/-141B
ASSEMBLY DETAIL**



SECTION A-A
SCALE 4X D5-2

RELEASED
2009-10-29
WJ

WJ 54732

DESIGN	<i>PH</i>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>Q</i>	DRAWING NO.	REV. D
MFG. APPR.	<i>Q</i>	D212-664-141	SHEET 2 OF 4
APPROVED	<i>PH</i>	TITLE	SCALE
DE APPR.	<i>H</i>	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
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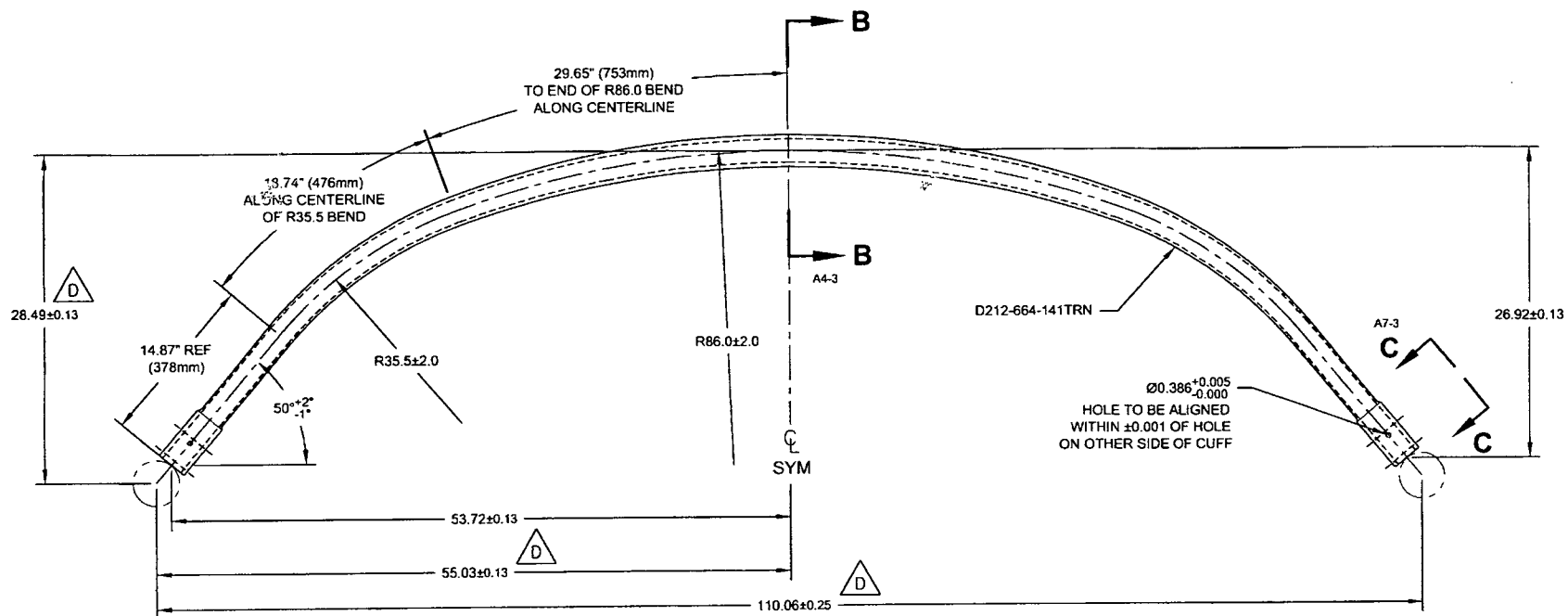
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

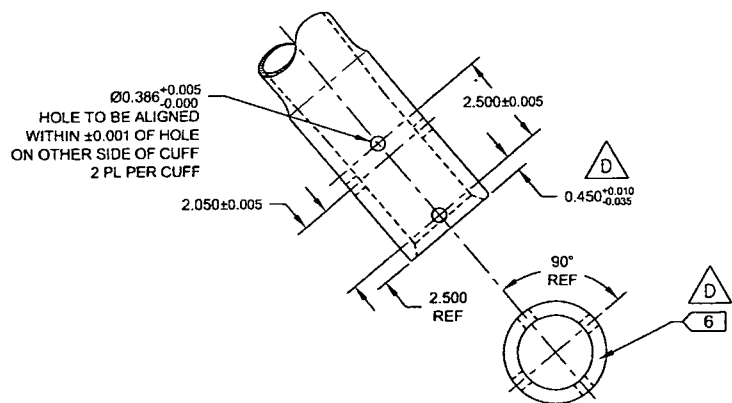
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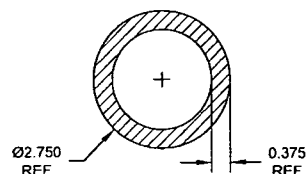
NOTE: Date & initial all entries



D212-664-501
BENDING AND DRILLING DETAIL



VIEW C-C: CUFF DETAIL
SCALE 3X



SECTION B-B
SCALE 4X

RELEASED
2009-10-29

WLO 54732

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. D
MFG. APPR.	IS	D212-664-141	SHEET 3 OF 4
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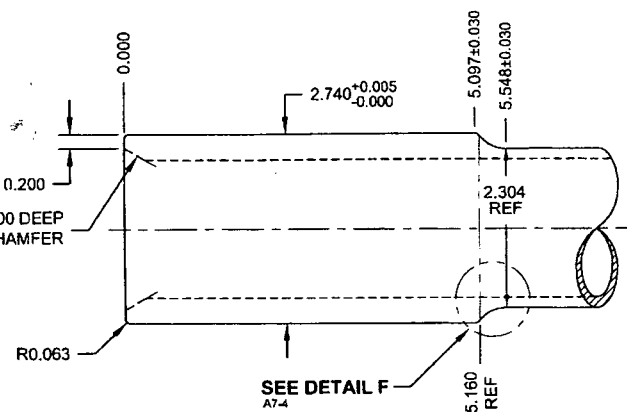
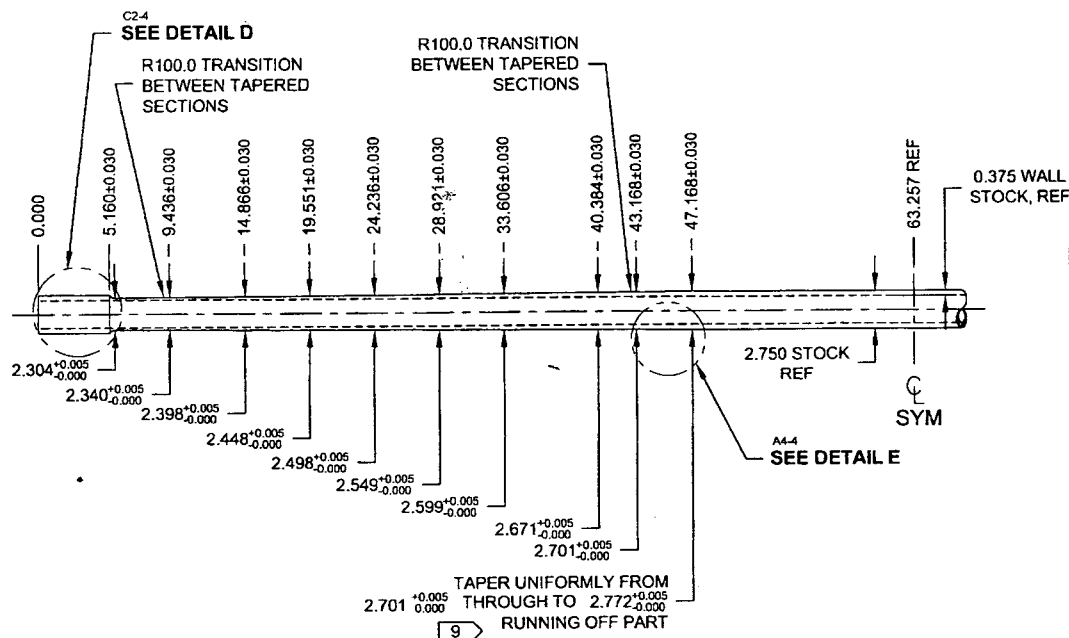
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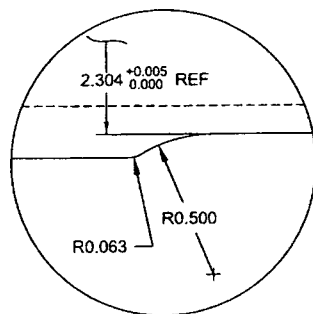
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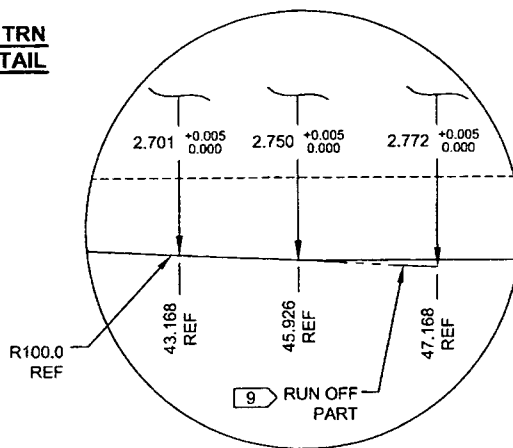


DETAIL D:
 CROSSTUBE CUFF
 SCALE 5X

D212-664-141TRN
 TURNING DETAIL



DETAIL F:
 CUFF TRANSITION
 SCALE 10X



DETAIL E:
 TAPER RUN-OFF
 NOT TO SCALE

RELEASED
 2009-10-29

54732

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. D
MFG. APPR.	10	D212-664-141	SHEET 4 OF 4
APPROVED	10	TITLE	SCALE
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